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5. As there are $2^2(n-1)(n-2)$ different arcs on c_0 , the total number x of polygons is

$$2^2(n-1)(n-2)(n-3)!2^{2n-3},$$

or $x=(n-1)!2^{2n-1}$.

6. To find the total number of all possible spherical polygons that may be formed by arcs of n great circles, it is clear that there will be $(r-1)!2^{2r-1}$ polygons of r sides, and consequently

C_0	$\angle B$				
C_1	$\overset{2}{C}$	$\overset{2}{D}$			2^2
C_2	$\overset{2}{E}$	$\overset{2}{F}$	$\overset{2}{E}$	$\overset{2}{F}$	2^4
C_3	$\overset{2}{G}$	$\overset{2}{H}$	$\overset{2}{G}$	$\overset{2}{H}$	2^6
\vdots					\vdots
C_{n-2}	$\overset{2}{X}$	$\overset{2}{Y}$	$\overset{2}{X}$	$\overset{2}{Y}$	$(2-n)2$

$$\sum_{r=3}^{r=n} [{}^nC_r \cdot (r-1)!2^{2r-1}]$$

will be the number of all possible polygons.

7. *Examples.* With three great circles on a sphere $(3-1)!2^{3-1}=64$ triangles may be formed. The number of spherical triangles and quadrangles which may be formed by four great circles is

$$(4-1)!2^{3-1}+{}^4C_3 \cdot (3-1)!2^{3-1}=768+4 \cdot 64=1024.$$

PROBLEMS FOR SOLUTION.

ALGEBRA.

226. Proposed by **ELMER SCHUYLER**, Brooklyn, N. Y.

Find the real roots of the system

$$\begin{aligned} x^2+w^2+v^2 &= a^2, & vw+u(y+z) &= bc, \\ w^2+y^2+u^2 &= b^2, & wu+v(z+x) &= ca, \\ v^2+u^2+z^2 &= c^2, & uv+w(x+y) &= ab. \end{aligned}$$

227. Proposed by **G. I. HOPKINS**, A. M., Manchester, N. H.

$$\begin{aligned} &\text{Solve } x+y+xy+x^2y+xy^2+x^3y+2x^2y^2+xy^3+x^3y^2+x^2y^3=11; \\ &x^4y+3x^3y^2+3x^2y^3+2x^4y^2+4x^2y^3+2x^2y^4+4x^4y^3+4x^3y^4+xy^4+x^5y^2+x^5y^3+2x^4y^4+x^2y^5 \\ &+x^3y^5=30. \end{aligned}$$

GEOMETRY.

251. Proposed by **R. D. CARMICHAEL**, Hartselle, Ala.

Represent the vertices of any regular polygon by the consecutive numbers 1, 2, ..., p , ..., q , ..., r , ..., n . To find the sides and area of the triangle formed by joining p , q , and r .